AMENDMENTS IN THE SPECIFICATION

On page 3, under the section entitled "Brief Description of the Drawings," please amend as follows:

FIG. 1 is a cross-sectional view of one embodiment of the commutator according to the present invention.

FIG. 2 is a perspective view of the embodiment of FIG. 1.

FIG. 3 is a perspective view of another embodiment of the commutator of the present invention.

<u>FIG. 4 is a perspective view of another embodiment of the commutator of the present invention.</u>

<u>FIG. 5 is a cross-sectional view of the commutator embodiment of FIG. 1 mounted on a shaft and a sensor positioned relative to the commutator.</u>

Amendments to Specification

On page 5 of the specification, please amend the existing second and third paragraphs as follows:

The magnet 16 is preferably, but does not have to be, formed before its incorporation into the assembly. The magnet 16 may be made from a so-called "green" pre-form mixture of magnet powder and thermo-set resin binder, which is subsequently heated and/or compressed and/or otherwise cured to form the final magnet. The magnet powder may be of any magnet material. Non-electrically conductive magnet materials, such as strontium ferrite (SrFe) or barium ferrite (BaFe), however, have proved especially useful in this application. While the magnet 16 may be formed using other techniques, such as by curing, it is preferably formed by compressing the powder mixture into a mold, which may be performed under no or minimal heat. While the magnet 16 may be molded into any shape, because commutators are typically cylindrical, a continuous magnet ring <u>(see FIGS. 2-4)</u> is preferable. The commutator 10 is not limited to a single magnet, but may be equipped with multiple magnets. The magnet or magnets may be magnetized with an array of magnetic poles either on the outer diameter, the top face, or both.

The core 14 is made of electrically-insulative material, typically (although not necessarily) phenolic, and defines a central aperture 20 for receiving a spindle or shaft <u>32</u> in use <u>(see FIG. 5)</u>. The core 14 preferably contacts the magnet 16 to secure the magnet 16 in the commutator 10. Moreover, the core 14 also surrounds the anchor 18, thereby securing the core 14 in position relative to the shell 12.

Please amend page 6 of the specification as follows:

While the shell 12, magnet 16, and core 14 of the commutator 10 may be assembled such as by welding or gluing the components together, the commutator 10 is preferably manufactured using a method that obviates the need for such retention means, but rather relies on the commutator's 10 design and materials to impart stability to the assembly. In one possible manufacturing process, the magnet pre-form 16 and shell 12 are first positioned within the commutator mold. Note, however, that a pre-formed magnet need not be used. Instead of pre-forming the magnet powder mixture into the magnet, the powder mixture could simply be poured directly into the mold. Regardless, after the magnet material (whether pre-formed into a magnet or in powder form) and shell 12 are positioned within the mold, the phenolic core 14 is injection-molded into the mold. The act of such molding embeds portions of the anchor 18 within the core 14, thereby securing its position relative to the shell 12. Moreover, the molded core 14 also intimately contacts the already-placed magnet 16. The high pressures and temperatures used to mold the core 14 likewise concurrently mold the magnet 16, bonding the core 14 and magnet 16 together at their interface (typically via inter-bonding of resins contained in both the core 14 and the magnet 16) and mechanically interlocking features (i.e. protrusions and cavities not shown) on their adjoining surfaces (or possibly created by at least slight deformation of either or both components during the molding process). This chemical bonding <u>(illustrated by darkened lines 15 in FIGS. 1-5)</u> and mechanical interlock between the core 14 and magnet 16 functions to secure the magnet 16 within the shell 12.

Please amend page 7 of the specification as follows:

While, in the embodiments of FIGS. 1 and 2, the magnet 16 is positioned on the face 26 of the commutator 10, the magnet may also be incorporated into a face-style commutator and positioned on the outer diameter of the commutator. Moreover, while the commutator 10 of

FIGS. 1 and 2 relies upon the metal shell 12 for electrical conductivity, the commutator 10 may also be manufactured in accordance with the '136 Patent to include electrically-conductive pre-forms, preferably, but not necessarily, made from a carboneous material. If the carbon pre-forms 22 are positioned on the face 26 of the commutator 10, as shown in FIG. 4, the magnet 16 is preferably positioned on the barrel 28 of the commutator 10. Alternatively, as shown in FIG. 3, if the carbon pre-forms 22 are positioned on the barrel 28 of the commutator 10, the magnet 16 is preferably positioned on the face 26 of the commutator 10.

As illustrated in FIG. 5, magnetic ~~Magnetic~~ sensors 30, such as Hall-Effect sensors, may then be used in combination with the commutator 10 of the present invention to detect and read the flux emitted from the magnet 16 on the commutator 10. Persons skilled in the relevant art will understand how to position and mount the sensors on the motor housing to read the flux lines emitted from the magnet. Because the magnet 16 is preferably of a non-electrically conductive material, it does not impact, in and of itself, the operation of the motor. Rather the output from the sensors can be used to determine operating characteristics of the motor (such as speed, angular position, acceleration, etc.) and thereby allow the user to detect and diagnose problems in the motor and adjust parameters (such as current) of the motor to impact its operation and performance.

AMENDMENTS IN THE CLAIMS

Please cancel claims 6, 7, 9, 11, 14-16, 28, and 32 without prejudice.

1. (Amended) A commutator comprising at least one magnet chemically-bonded to [[the]] an electrically-insulating commutator core.

2. (Original) The commutator of claim 1, wherein the at least one magnet facilitates the collection of information regarding properties of the motor.

3. Cancelled.

4. (Previously Presented) A sensing assembly comprising the commutator of claim 1 and a sensor.

5. (Amended) The commutator of claim [[35]] 37, wherein the metal [[shell]] comprises copper.

6. Cancelled.

7. Cancelled.

8. (Amended) The commutator of claim [7] 35, wherein [the shell] at least one of the electrically-conductive segments comprises an inner surface and at least one anchor extending radially inwardly from the inner surface of the [shell] segment.

9. Cancelled.

10. (Previously Presented) The commutator of claim 35, wherein the magnet comprises electrically non-conductive material.

11. Cancelled.

12. (Amended) The commutator of claim [[11]] 35, wherein the magnetic powder comprises strontium ferrite.

13. (Amended) The commutator of claim [[11]] 35, wherein the magnetic powder comprises barium ferrite.

14. Cancelled.

15. Cancelled.

16. Cancelled.

17. (Amended) The commutator of claim [[16]] 35, wherein the electrically-conductive commutator segments ~~material~~ comprise[[s]] a carboneous material.

18. (Amended) The commutator of claim [[16]] 17, wherein the [[core]] carboneous material comprises a material that chemically bonds with at least a portion of the ~~inner face of the electrically-conductive material~~ commutator core and magnet.

19. (Original) The sensing assembly of claim 4, further comprising a magnetic sensor.

20. (Original) The sensing assembly of claim 19, wherein the sensor comprises a variable reluctance sensor.

21. (Original) The sensing assembly of claim 19, wherein the sensor comprises a Hall-Effect sensor.

22. (Previously Presented) A method of manufacturing a commutator comprising:

a. providing a shell;

b. providing a magnet;

b. positioning the magnet at least partially adjacent the shell; and

c. molding an electrically-insulative core in contact with the magnet and the shell, wherein the core chemically bonds with the magnet during molding.

23. Cancelled.

24. (Original) The method of claim 22, wherein providing a magnet comprises mixing a magnet powder and a resin to form a powder mixture and compressing the powder mixture to form the magnet.

25. (Original) The method of claim 22, further comprising curing the core and magnet together.

26. Cancelled.

27. (Previously Presented) The method of claim 22, wherein molding the core further comprises mechanically interlocking the core and the magnet.

28. Cancelled.

29. Cancelled.

30. (Previously Presented) The commutator of claim 1, wherein the at least one magnet is a substantially continuous ring.

31. (Previously Presented) The commutator of claim 35, wherein the at least one magnet is a substantially continuous ring.

32. Cancelled.

33. (Previously Presented) The method of claim 22, wherein the magnet is a substantially continuous ring.

34. (Previously Presented) The method of claim 22, wherein the magnet is a magnet pre-form.

35. (Amended) The commutator of claim 1, further comprising [[:]]

~~a. a shell;~~

~~b. an insulating core positioned adjacent the shell; and~~

~~c. the at least one magnet positioned adjacent and chemically bonded to the core.~~

a plurality of electrically-conductive commutator segments, wherein the electrically-insulating commutator core comprises an electrically-insulating thermo-set resin positioned adjacent the segments and defines a central aperture and wherein the at least one magnet comprises magnetic powder and a thermo-set resin chemically bonded to the commutator core by inter-bonding of resins of the commutator core and magnet.

36. (Previously Presented) The commutator of claim 35, wherein the core is molded in contact with the at least one magnet.

Please add the following new claims:

37. (New) The commutator of claim 35, wherein the commutator segments comprise metal.

38. (New) The commutator of claim 35, wherein the commutator comprises a barrel and a face and wherein the electrically-conductive commutator segments are positioned on the barrel of the commutator and the at least one magnet is positioned on the face of the commutator.

39. (New) The commutator of claim 35, wherein the commutator comprises a barrel and a face and wherein the electrically-conductive commutator segments are positioned on the face of the commutator and the at least one magnet is positioned on the barrel of the commutator.

REMARKS

This Amendment and Response amends the Specification, Figures 1-3, and claims 1, 5, 8, 12, 13, 17, 18, and 35, adds new Figures 4 and 5 and new claims 37-39, and cancels claims 6, 7, 9, 11, 14-16, 28, and 32 without prejudice. With this Amendment and Response, claims 1, 2, 4, 5, 8, 10, 12, 13, 17-22, 24, 25, 27, 30, 31, 33-39 are pending in this application. A petition for a time extension and check for the extension period in the amount of $420 is enclosed. No further fees are due; however, the Patent Office is authorized to debit deposit account 11-0855 if it determines otherwise.

I. Drawings

The Action objects to the drawings as not showing every feature of the invention specified in the claims. The Action maintains that (1) the chemical bonds, (2) the sensor, (3) the variable reluctance sensor, (4) the hall sensor, (5) the magnet positioned on the outer cylindrical wall, (6) the magnet being a substantially continuous ring, and (7) the electrically conductive material positioned within the shell with an inner surface and outer surface to contact a brush must be shown or the feature canceled from the claims.

Amended Figures 1-3 are provided behind Tabs 1-3, respectively. Two copies of each amended figure is provided – a clean copy and a marked copy indicating the changes in red. Figure 1 has been amended to accurately reflect that a cross-section of the commutator of the present invention has a shell segment 12 on each side of the structure. The barrel 28 and face 26 of the commutator (discussed at page 7, lines 1-11) have also been added to Figures 1-3. Additional changes to Figures 1-3 are discussed below. Moreover, new Figures 4 and 5, both of

which include structure fully supported by the specification and therefore do not constitute new matter, are submitted herewith behind Tabs 4 and 5, respectively.

(1) Chemical Bonds.

The chemical bonds, fully supported in the specification at page 6, lines 14-21 of the application, are shown with bolded lines and indicated with the reference number "15" in Figures 1-5. Thus, the Action's objection to the drawings for failure to show this feature has been overcome, and the objection should be withdrawn.

(2) The sensor, (3) the variable reluctance sensor, and (4) the hall sensor.

New Figure 5 shows the commutator mounted onto a shaft 32 and a sensor 30 positioned adjacent the magnet. The disclosure in Figure 5 is fully supported by the specification. Page 5, lines 19-21 discusses mounting the commutator on a shaft, as shown in Figure 5. Moreover, page 2, lines 11-12 teach placing the sensors "within the motor housing [to] detect and read the flux lines emitted from the magnet on the commutator," and page 7, lines 12-16 teaches using the sensors in combination with the commutator "to detect and read the flux emitted from the magnet 16 on the commutator 10." Thus, the specification clearly teaches mounting the commutator on a shaft and positioning the sensor to read the flux emitted from the magnet on the commutator, as shown in Figure 5. Thus, inclusion of new Figure 5 does not constitute new matter. Because Figure 5 cures the Action's objection to the drawings for failure to show a sensor, the objection should be withdrawn.

Moreover, Applicants' Assignee disagrees that a separate variable reluctance sensor and Hall sensor need be shown. Rather, sensor 30 is representative of all types of sensors, including a Hall sensor and a variable reluctance sensor.

(5) The magnet positioned on the outer cylindrical wall.

New Figure 4 show an embodiment of a commutator with "carbon pre-forms [22] positioned on the face of the commutator, and the magnet [16] positioned on the barrel of the commutator." Specification, page 7, lines 7-9. This disclosure, along with the disclosure of "U.S. Patent Nos. 5,760,518 and 5,826,324 to Abe et al. (also incorporated herein in their entireties by this reference) [which] disclose[s] a face-style commutator having electrically-conductive graphite segments located on the face of the commutator for conducting electricity" (page 4, lines 12-16), fully supports Figure 4, and thus inclusion of new Figure 4 does not constitute new matter. Because Figure 4 cures the Action's objection to the drawings for failure to show "the magnet positioned on the outer cylindrical wall" or barrel of the commutator, the objection should be withdrawn.

(6) The magnet being a substantially continuous ring.

Figures 2 and 3 have been amended to disclose and Figure 4 discloses a magnet being a substantially continuous ring. Applicants Assignee in no way intends for the amendments to Figures 2 and 3 to limit the scope of the invention to only magnets shaped as a continuous ring. Rather, as clearly described in the specification, "the magnet 16 may be molded into any shape" and "[t]he commutator is not limited to a single magnet." Page 5, lines 14-17. Thus, neither does the application support an interpretation that the magnets be shaped only as a continuous ring. Applicants submit that these amendments to Figures 2 and 3 and new Figure 4 cure any alleged deficiencies and respectfully request withdrawal of the objections to the drawings.

(7) Electrically conductive material positioned within the shell with an inner surface and outer surface to contact a brush.

Electrically conductive material positioned within the shell with an inner surface and outer surface to contact a brush is a feature recited in claim 16, which has been cancelled. Thus,

the Action's objection to the drawings on this basis is thereby rendered moot and should be withdrawn.

II. Amendments to the Specification

The specification has been amended merely to reflect the addition of Figures 4 and 5 and the changes in Figures 1-3, discussed above in Part I. No new matter has been added to the specification.

III. 35 U.S.C. § 112 Rejections

Claims 1, 2, 4-21, 30-32, 35, and 36 have been rejected under 35 U.S.C. § 112 as failing to comply with the written description requirement. Claims 6, 7, 9, 11, 14-16, 28, and 32 have been cancelled, thereby rendering moot the Action's rejection of these claims.

The Action maintains that the "specification does not have a full, clear, concise, and exact written description of what constitutes a chemical bond between the magnet and the core." Action, ¶4. Applicants traverse this rejection and ask that it be withdrawn. The specification clearly and fully describes the chemical bond between the magnet and the core:

> The high pressures and temperatures used to mold the core 14 likewise concurrently mold the magnet 16, ***bonding*** the core 14 and magnet 16 together at their interface (***typically via inter-bonding of resins contained in both the core 14 and the magnet 16***) and mechanically interlocking features (i.e. protrusions and cavities not shown) on their adjoining surfaces (or possibly created by at least slight deformation of either or both components during the molding process). ***This chemical bonding*** and mechanical interlock between the core 14 and magnet 16 functions to secure the magnet 16 within the shell 12.

Specification, page 6, lines 14-21. The application makes clear that chemical bonding occurs between the core and the magnet and that such bonding typically occurs by inter-bonding resins in both the core and the magnet. Thus, Applicants' Assignee respectfully maintains that the specification clearly and fully describes the chemical bond between the magnet and the core so as to reasonably convey to one skilled in the art that the inventors has possession of the claimed

invention at the time of filing. Applicants' Assignee respectfully requests withdrawal of the rejection on this basis.

The Action also maintains that "[t]he specification does not contain a written description of an electrically conductive material within the shell with an inner surface and outer face to contact a brush." As explained *supra* Part I, electrically conductive material positioned within the shell with an inner surface and outer surface to contact a brush is a feature recited in cancelled claim 16, and thus, the Action's rejection to the claims on this basis is thereby rendered moot and should be withdrawn.

IV. 35 U.S.C. 103 Rejections

A. Nishimura et al. and Vig et al.

Claims 1 and 2 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al. and Vig et al. Claim 1 has been amended to recite a commutator comprising at least one magnet chemically-bonded to an electrically-insulating commutator core. The Action maintains that Nishimura et al. discloses injection molding a commutator core around a magnet. However, the Action acknowledges that: "Nishimura does not teach a chemical bond between the commutator and the support.[1] Vig teaches the connection between the permanent magnet and the support can be a chemical bond . . . . It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the commutator of Nishimura with the chemical bond between the magnet and the molded support [of Vig]." Action, page 4, ¶ 6. In doing so, the Action is apparently introducing the generic term "support" to refer to both the commutator disclosed in Nishimura and the concentrator disclosed in Vig and then maintaining

[1] Applicants' Assignee is unclear what is meant by "commutator and support" but believes that such language should have instead been "Nishimura does not teach a chemical bond between the *magnet* and the support."

that it would have been obvious to apply the chemical bonding of Vig to the commutator of Nishimura.

Applicants' Assignee respectfully disagrees and requests withdrawal of this rejection. Vig teaches integrally-forming (via mechanical or chemical bonding) a magnetic structure comprising a magnet and a concentrator. More specifically, Vig teaches molding magnetically permeable material (the concentrator material) around a pre-formed magnet to form an integral magnet structure. Thus, at most Vig teaches a magnet structure. Combining Vig's teaching of an integrally-formed magnet with Nishimura does not result in the subject matter recited in claim 1 and therefore does not render obvious claim 1. Rather, at most combining the two references would merely teach one of skill in the art to substitute the molded, chemically-bonded magnet structure of Vig for the magnet disclosed in the Nishimura commutator. Neither reference teaches chemically bonding a commutator core to a magnet or indicates that such a bond would even be possible or effective between a magnet and a commutator core. Again, Vig merely teaches chemically bonding a magnet structure together, not bonding (chemically or otherwise) that structure to another structure (a commutator core) as recited in claim 1. For at least this reason, the combination of Nishimura and Vig fail to render obvious claim 1, and claim 1, as well as claim 2 which depends from claim 1, is allowable.

Moreover, nor would one of skill in the art be motivated to substitute the magnet structure in Vig for the magnet in Nishimura for the additional reason that the Vig magnet structure is a solid structure that does not include an aperture. *See* Figures 4A, 5A, 6A, and 7 (showing a ring magnet but the aperture filled by the concentrator material). Thus, the magnet structure taught in Vig would never be substituted into the Nishimura commutator because to do

so would prevent mounting and operation of the commutator. Claims 1 and 2 are not obvious and thus allowable for this additional reason.

Furthermore, the Action analogizes the concentrator of Vig to the recited commutator core. This is improper. There is not teaching or suggestion in Vig that one could adapt the concentrator of Vig to apply it to a commutator core. Even assuming, *arguendo*, that such an analogy were proper (which it is not), combining Vig with Nishimura would still fail to result in the recited subject matter. Vig teaches forming an integral magnet structure by molding a concentrator of plastic material impregnated with magnetically permeable material to a magnet. Vig discloses that the magnetically permeable material includes "iron, stainless steel, ferrite, and iron oxide" – all electrically-conductive materials. Vig, col. 2, ll. 8-14 and col. 4, ll. 9-15. Thus, the concentrator in Vig (which the Action analogizes to the commutator core) is electrically-conductive. Vig does not teach a concentrator comprising materials other than electrically-conductive material, nor is there any suggestion in Vig that non-electrically conductive materials could be used in the concentrator.

Claim 1 recites an *electrically-insulating* commutator core. An electrically-insulating commutator core is necessary to ensure the proper operation of the commutator to supply current to the rotor. If the commutator core were electrically-conductive, the electricity would conduct through the core to adjacent commutator segments on the commutator. This, in turn, would interfere with the flow of current to the rotor and generation of the rotor magnetic field. The magnetic rotor field would therefore not properly interact with the magnetic stator field, leading to motor failure. Thus, even if the concentrator of Vig were properly analogized to the recited commutator core (which it is not), one of skill in the art would not apply the teaching of Vig (of a magnet bonded to an *electrically-conductive* concentrator) to chemically-bond a magnet to a

commutator core that is electrically-insulating, as recited in claim 1. There is no teaching in Vig of bonding a magnet to electrically-insulating material (much less a commutator core) and no suggestion that the chemical bonding disclosed in Vig could successfully do so. For this additional reason, Nishimura et al. and Vig fail to render obvious claims 1 and 2, and these claims are allowable.

B. Nishimura et al. and Vig et al. in further view of Kageyama et al.

Claims 4-9, 15, 16, 18, 19, 35, and 36 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al. and Vig et al. in further view of Kageyama et al. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Claims 6, 7, 9, 15, and 16 have been cancelled, thereby rendering moot the Action's rejection of these claims. Moreover, irrespective of whether the Action's characterization of the Kageyama et al. reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Part IV.A. Because none of the cited references, alone or in combination, render claim 1 obvious, claims 4, 5, 8, 18, 19, 35, and 36, which depend from claim 1, are also not obvious and are allowable.

C. Nishimura et al., Vig et al., and Kageyama et al. in further view of Schechinger et al.

Claims 10, 19, and 21 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kageyama et al. in further view of Schechinger et al. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Irrespective of whether the Action's characterization of the Schechinger et al. reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts IV.A and IV.B. Because none of the cited references, alone or

in combination, render claim 1 obvious, claims 10, 19, and 21, which depend from claim 1, are also not obvious and are allowable.

D. Nishimura et al., Vig et al., and Kageyama et al. in further view of Kawashima

Claims 10-13 and 32 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kageyama et al. in further view of Kawashima. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Claims 11 and 32 have been cancelled, thereby rendering moot the Action's rejection of these claims. Moreover, irrespective of whether the Action's characterization of the Kawashima reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts IV.A and IV.B. Because none of the cited references, alone or in combination, render claim 1 obvious, claims 10, 12, and 13, which depend from claim 1, are also not obvious and are allowable.

E. Nishimura et al., Vig et al., and Kageyama et al. in further view of Uchiyama

Claims 14 and 31 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kageyama et al. in further view of Uchiyama. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Claim 14 has been cancelled, thereby rendering moot the Action's rejection of this claim. Moreover, irrespective of whether the Action's characterization of the Uchiyama reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts IV.A and IV.B. Because none of the cited references, alone or in combination, render claim 1 obvious, claim 31, which depends from claim 1, is also not obvious and is allowable.

F. Nishimura et al., Vig et al., and Kageyama et al. in further view of Marsal

Claim 17 is rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kageyama et al. in further view of Marsal. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Irrespective of whether the Action's characterization of the Marsal reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts IV.A and IV.B. Because none of the cited references, alone or in combination, render claim 1 obvious, claim 17, which depends from claim 1, is also not obvious and is allowable.

G. Nishimura et al., Vig et al., and Kageyama et al. in further view of Adler

Claims 10, 19, and 20 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kageyama et al. in further view of Adler. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Irrespective of whether the Action's characterization of the Adler reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts IV.A and IV.B. Because none of the cited references, alone or in combination, render claim 1 obvious, claims 10, 19, and 20, which depend from claim 1, are also not obvious and is allowable.

PETITION FOR TWO-MONTH TIME EXTENSION

To the extent necessary, under 37 C.F.R. § 1.136(a) (1998) assignee hereby petitions that the period for responding to the Action mailed on May 23, 2003 be extended for two months, up to and including October 23, 2003. Enclosed is a check in the amount of $420 to cover the appropriate fee for this extension under 37 C.F.R. § 1.17.

CONCLUSION

Applicants' Assignee respectfully submits that claims 1, 2, 4, 5, 8, 10, 12, 13, 17-22, 24, 25, 27, 30, 31, 33-39 are in condition for immediate allowance, and request early notification to that effect. If any issues remain to be resolved, the Examiner is respectfully requested to contact the undersigned at 404.815.6389 to arrange for a telephone interview prior to issuance of a final Office action.

Respectfully submitted,

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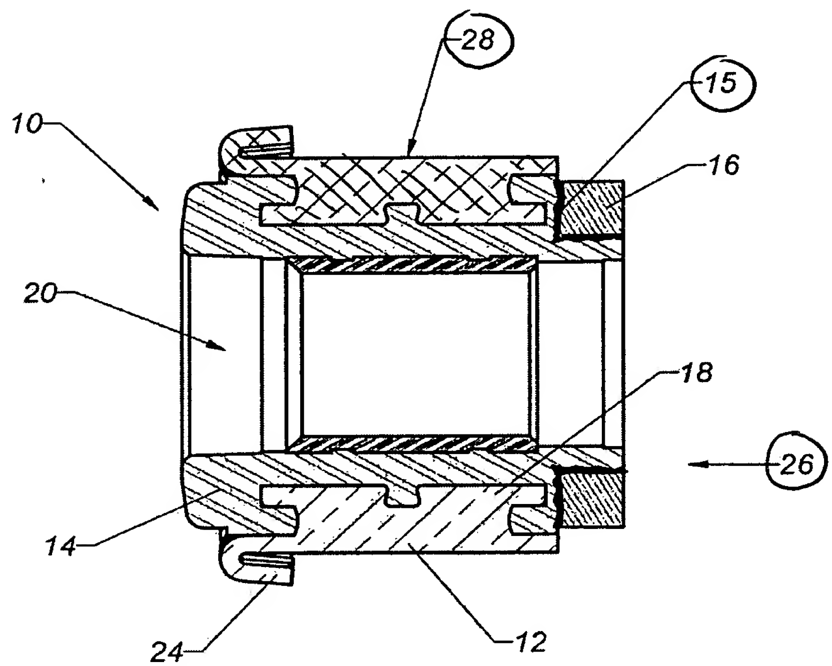

FIGURE 1

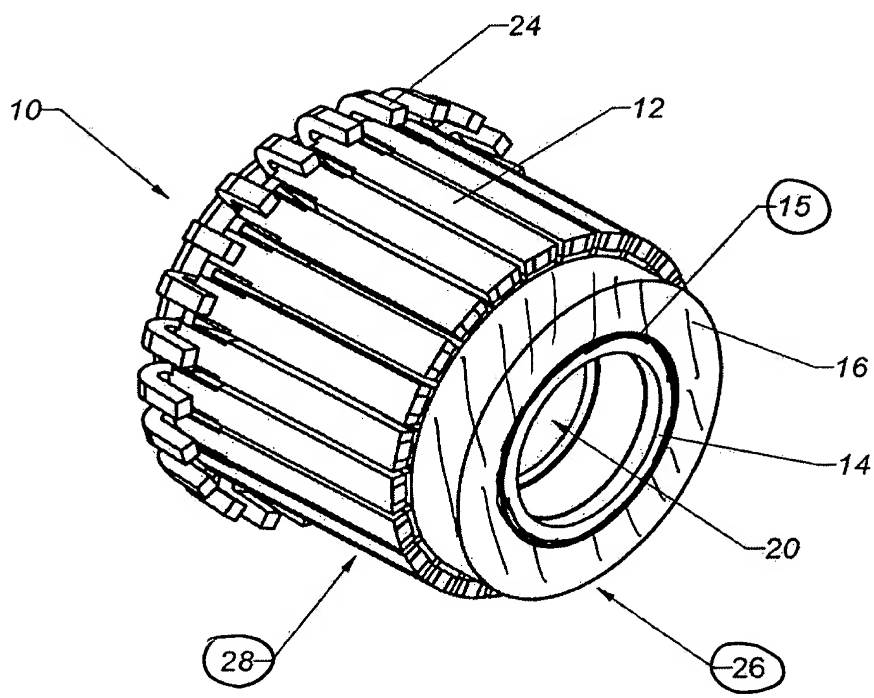

FIGURE 2

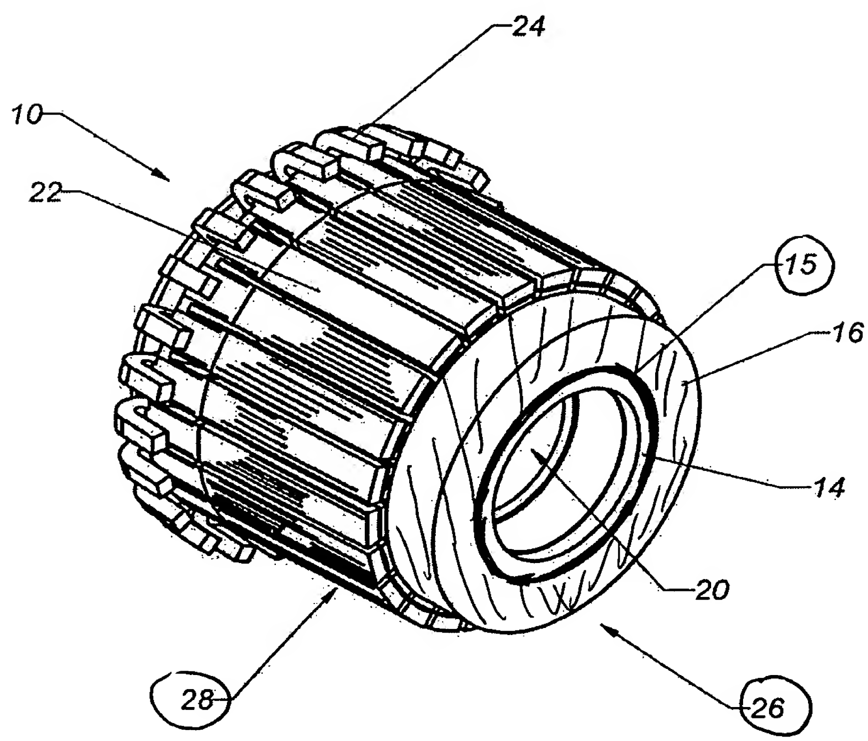

FIGURE 3